

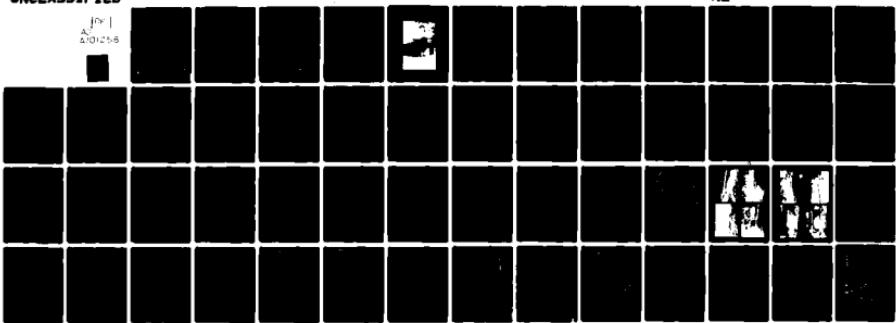
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D'APPOLONIA CONSULTING ENGINEERS INC PITTSBURGH PA  
NATIONAL DAM INSPECTION PROGRAM, PERRINS MARSH DAM (NDI I.D. PA--ETC(U)  
1981 L D ANDERSEN

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SUSQUEHANNA RIVER BASIN  
WHITELOCK CREEK, WYOMING COUNTY

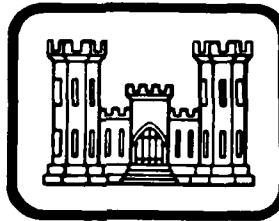
PENNSYLVANIA

**PERRINS MARSH DAM**

NDI I.D. PA-0886  
DER I.D. 066-005  
OWNER: MR. ELMER REESE

**PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM**

"Original contains color  
plates. All DTIC reproduct-  
ions will be in black and  
white."



PREPARED FOR

DEPARTMENT OF THE ARMY  
BALTIMORE DISTRICT, CORPS OF ENGINEERS  
BALTIMORE, MARYLAND 21203

BY

D'APPOLONIA CONSULTING ENGINEERS  
10 DUFF ROAD  
PITTSBURGH, PA. 15235

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Contract DACW31-81-C-0014

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## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon visual observations and review of available data. Detailed investigations and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The assessment of the conditions and recommendations was made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

PHASE I REPORT  
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Perrins Marsh Dam  
STATE LOCATED: Pennsylvania  
COUNTY LOCATED: Wyoming  
STREAM: Whitelock Creek, tributary of Susquehanna River  
SIZE CLASSIFICATION: Small  
HAZARD CLASSIFICATION: Significant  
OWNER: Mr. Elmer Reese  
DATE OF INSPECTION: November 10, 1980 and February 5, 1981

Accession For	
NTIS	GRA&I <input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <u>Per DTIC Form 50</u>	
Distribution/ <u>on file</u>	
Availability Codes	
Dist	Avail and/or Special
A	

ASSESSMENT: Based on the evaluation of the existing conditions, the condition of Perrins Marsh Dam is considered to be poor. The dam is old (built prior to 1919) and is in need of general repair and restoration. The dam has no low level outlet facilities.

The flood discharge capacity of the dam was evaluated according to the recommended criteria and it was found that the dam cannot pass the recommended spillway design flood of 100-year flood without overtopping the nonoverflow section of the dam. Therefore, the flood discharge capacity of the dam is considered to be inadequate.

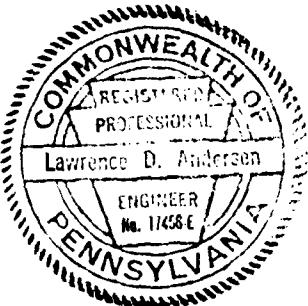
The following recommendations should be implemented as soon as possible or on a continuing basis.

1. The owner should determine the nature and extent of improvements required to provide adequate spillway capacity, and to repair and restore the dam.
2. In conjunction with this work, means should be provided to draw down the reservoir when required.
3. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert the downstream residents in the event of emergencies.
4. The owner should develop a formal operating and maintenance plan and inspect the dam regularly and perform necessary maintenance.

DTIC  
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(15) DACW31-81-C-ΦΦ14

Assessment - Perrins Marsh Dam



*Lawrence D. Andersen*  
10 Lawrence D. Andersen, P.E.  
Vice President

March 19, 1981  
Date

Approved by:

*James W. Peck*  
JAMES W. PECK  
Colonel, Corps of Engineers  
District Engineer  
22 May 81  
Date

(6)

National Dam Inspection Program.  
Perrins Marsh Dam (NDI I.D. PA-0886,  
DER I.D. 066-005), Susquehanna River  
Basin Whitelock Creek, Wyoming County,  
Pennsylvania. Phase I Inspection Report

127 55 ]

PERRINS MARSH DAM

NDT L.D. PA-0886

DER L.D. 066-005

NOVEMBER 10, 1980



Looking Downstream



Looking Upstream

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PHASE I REPORT  
NATIONAL DAM INSPECTION PROGRAM  
PERRINS MARSH DAM  
NDI I.D. PA-0886  
DER I.D. 066-005

SECTION 1  
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Dam and Appurtenances. Perrins Marsh Dam, which is also known as Brown's Pond Dam or Schoonover's Lake, consists of a six-foot-high stone wall, backed by earth fill on the upstream side. In its present configuration, the dam appears to be about 50 to 60 feet long, with a 28-foot-long segment forming the overflow section of the dam. The overflow section is capped with a six-foot-wide concrete slab which appears to be about one foot thick. The earth fills flanking the overflow section gradually merge into the natural abutments with no discernible embankment-abutment junction. The dam does not appear to have any low level outlet facilities. It appears that this dam was constructed at the outlet of a natural lake to raise the lake level.

b. Location. The dam is located (N41° 24.3', W75° 55.4') on Whitelock Creek, approximately one mile south of Center Moreland in Northmoreland Township, Wyoming County, Pennsylvania. Plate 1 illustrates the location of the dam.

c. Size Classification. Small (based on 6-foot height and 417 acre-feet maximum storage capacity).

d. Hazard Classification. The dam is classified to be in the significant hazard category. Below the dam, Whitelock Creek flows about 150 feet, falls over a stone wall, then flows under a bridge. A house located downstream of the bridge is considered to be in the floodplain of the creek. The stream flows adjacent to a rural residential area for approximately one mile, and then discharges to an essentially uninhabited valley. It is estimated that a failure of this dam would likely cause damage to the downstream bridges and property in the rural residential area. Loss of a few lives is considered possible.

e. Ownership. Mr. Elmer Reese (address: R.D. #3-Box 273X, Dallas, Pennsylvania 18612).

f. Purpose of Dam. Recreation.

g. Design and Construction History. No reference was found to indicate when the dam was constructed. The dam was first inspected by the Commonwealth of Pennsylvania in 1919.

h. Normal Operating Procedure. As it presently exists, the reservoir is maintained at the level of the uncontrolled overflow elevation. The dam has no operable facility.

1.3 Pertinent Data. Elevations referred to in this section and subsequent sections of the report were calculated based on field measurements assuming the crest of the overflow section to be at Elevation 1174 (USGS Datum), which is shown to be the normal pool level for the reservoir on the USGS 7.5-minute Center Moreland quadrangle.

a. <u>Drainage Area</u>	1.8 square miles <sup>(1)</sup>
b. <u>Discharge at Dam Site (cfs)</u>	
Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	Not applicable
Gated spillway capacity at maximum pool	Not applicable
Ungated spillway capacity at maximum pool	34
Total spillway capacity at maximum pool	34
c. <u>Elevation (USGS Datum) (feet)</u>	
Top of dam	1174.6 (measured low spot)
Maximum pool	1174.6
Normal pool	1174.0
Upstream invert outlet works	Not applicable
Downstream invert outlet works	Not applicable
Maximum tailwater	Unknown
Toe of dam	1168 <sup>+</sup>
d. <u>Reservoir Length (feet)</u>	
Normal pool level	2800
Maximum pool level	2800 <sup>+</sup>
e. <u>Storage (acre-feet)</u>	
Normal pool level	420 <sup>+</sup> <sup>(2)</sup>
Maximum pool level	470 <sup>+</sup>

(1) Planimetered from USGS topographic maps.

(2) Estimated storage based on height of dam and reservoir area.

f. Reservoir Surface (acres)

Normal pool level	84
Maximum pool level	87+

g. Dam

Type	Stone wall and earth fill
Length	50 to 60 feet
Height	6 feet
Top width	6 to 20 feet
Side slopes	Downstream: Vertical Upstream: Undefined
Zoning	Unknown
Impervious core	Unknown
Cutoff	Unknown
Grout curtain	Unknown

h. Regulating Outlet

The dam has no low  
level regulating  
outlet.

i. Spillway

Type	Concrete over- flow section
Length	28 feet
Crest elevation	1174
Gates	None
Upstream channel	Lake
Downstream channel	Earth channel

SECTION 2  
DESIGN DATA

2.1 Design

a. Data Available. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER). The information includes correspondence, state inspection reports, and inspection photographs.

(1) Hydrology and Hydraulics. No design information is available on hydrology and hydraulics.

(2) Embankment. No information is available on the design of the embankment.

(3) Appurtenant Structures. No information is available on the design of appurtenant structures.

b. Design Features

(1) Embankment. No design information is available. It appears that the dam is an earth-fill structure, with a six-foot-high stone wall forming the downstream side of the dam.

(2) Appurtenant Structures. A 28-foot-wide concrete paved overflow section constitutes the spillway. It does not appear that the dam has low level outlet facilities.

c. Design Data

(1) Hydrology and Hydraulics. Information is not available on hydrology or hydraulics.

(2) Embankment. No engineering data are available on the design of the embankment.

2.2 Construction. No information is available on the manner in which the embankment was constructed.

2.3 Operation. There are no formal operating records maintained for the dam. An area on the left abutment, which appears to be an erosion scar, suggests that the dam might have been overtopped in the past.

2.4 Other Investigations. None reported.

2.5 Evaluation

a. Availability. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources.

b. Adequacy. No information is available to assess the adequacy of the design and construction of the dam.

SECTION 3  
VISUAL INSPECTION

3.1 Findings

a. General. The onsite inspection of Perrins Marsh Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.
2. Visual examination of the emergency spillway and the downstream discharge channel.
3. Evaluation of the downstream area hazard potential.

The specific observations are illustrated in Plate 2.

b. Embankment. The general inspection of the embankment consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing general maintenance conditions, erosion, and other surficial features.

In general, the condition of the dam is considered to be poor. The dam is old and is in need of repair and restoration. A section of the stone wall along the downstream face adjacent to the right abutment has partially collapsed. An area to the left of the overflow section appears to be an erosion scar caused by overtopping the left abutment. This condition suggests that overtopping of the abutment sections during severe storms may initiate a breach through the abutment sections.

The top of the dam and the abutment sections were surveyed relative to the overflow section of the dam. The profile is illustrated in Plate 3.

c. Appurtenant Structures. The overflow section of the dam, which constitutes the spillway, is the only appurtenant structure of the dam.

d. Reservoir Area. A map review indicates that the watershed is predominantly covered by woodlands. A review of the regional geology is included in Appendix F.

e. Downstream Channel. A description of the downstream conditions is included in Section 1.2 d.

3.2 Evaluation. The overall condition of the dam and its appurtenant structures is considered to be poor. It is recommended that the owner

immediately retain the services of a professional engineer for rehabilitation and restoration of the dam. Filling of the erosion scar on the left abutment and restoration of the concrete work and stone wall is recommended. The need for providing riprap at the junction of the overflow section and the abutments should be evaluated.

SECTION 4  
OPERATIONAL FEATURES

4.1 Procedure. There are no formal operating procedures for the dam. As it presently exists, the reservoir is maintained at the uncontrolled spillway crest level, with excess inflow discharging through the spillways.

4.2 Maintenance of the Dam. Maintenance of the dam is considered to be poor. It does not appear that attempts are being made to control the ongoing structural deterioration.

4.3 Maintenance of Operating Facilities. The dam has no operable facilities.

4.4 Warning System. No formal warning system exists for the dam. Telephone communication facilities are available via residences at the site.

4.5 Evaluation. The overall maintenance condition of the dam is considered to be poor. It is recommended that the owner correct the existing deficiencies and prepare a plan for continued future maintenance of the dam.

## SECTION 5 HYDRAULICS AND HYDROLOGY

### 5.1 Evaluation of Features

a. Design Data. Perrins Marsh Dam has a watershed of 1.8 square miles and impounds a reservoir with a surface area of 84 acres at normal pool level. The flood discharge facilities for the dam consist of the overflow section of the dam. The capacity of the overflow section, without overtopping the nonoverflow section, is estimated to be 34 cfs.

b. Experience Data. As previously stated, Perrins Marsh Dam is classified as a small dam in the significant hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass from the 100-year flood to one-half of the Probable Maximum Flood (PMF). In view of the height of the dam, which is at the lower limit of the small dam classification, the 100-year flood is selected as the spillway design flood.

The inflow hydrographs for the reservoir were determined utilizing the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army, Corps of Engineers. The data used for the computer analysis are presented in Appendix D. The 100-year flood, calculated in accordance to the recommended procedure, was found to have a peak flow of 1620 cfs. The computer input and a summary of the computer output for the 100-year flood routing are included in Appendix D.

c. Visual Observations. On the date of inspection, no conditions were observed that would indicate the capacity of the spillways would be significantly reduced in the event of a flood.

d. Overtopping Potential. The 100-year flood was routed through the reservoir and it was found that the nonoverflow section of the dam would be overtopped for a duration of 18.0 hours, with a maximum depth of 1.6 feet.

e. Spillway Adequacy. Because the capacity of the overflow section is less than the recommended spillway design flood (100-year flood), the spillway is classified to be inadequate.

SECTION 6  
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Dam. As discussed in Section 3, the dam was found to be in poor condition. However, the deficiencies observed are not considered to be significant relative to the overall stability of the dam under normal pool conditions.

(2) Appurtenant Structures. The dam has no appurtenant structures.

b. Design and Construction Data

(1) Dam. No design and construction information is available to aid in the assessment of the structural stability of the dam. However, as noted above, no conditions were observed that would significantly affect the stability of the dam. Therefore, structural stability of the dam is considered to be adequate.

(2) Appurtenant Structures. The dam has no appurtenant structures.

c. Operating Records. No operating records are maintained.

d. Postconstruction Changes. None reported.

e. Seismic Stability. The dam is located in Seismic Zone 1, and based on visual observations, the static stability of the dam appears to be adequate. Therefore, based on the recommended criteria for the evaluation of seismic stability of dams, the structure is presumed to present no hazards from earthquakes.

SECTION 7  
ASSESSMENT AND RECOMMENDATIONS/PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Assessment. Visual observations indicate that Perrins Marsh Dam is in poor condition. The dam is old and is in need of general repair and restoration.

The flood discharge capacity of the dam was evaluated according to the recommended criteria and it was found that the dam cannot pass the recommended spillway design flood (the 100-year flood) without overtopping the nonoverflow section of the dam. Therefore, flood discharge capacity of the dam is considered to be inadequate.

b. Adequacy of Information. Available information in conjunction with visual observations is considered to be sufficient to make a Phase I evaluation.

c. Urgency. The following recommendations should be implemented immediately or on a continuing basis.

d. Necessity for Additional Investigations. In view of the conditions described above, the owner should determine the extent of the improvements required to provide adequate spillway capacity and repair and restore the dam.

7.2 Recommendations/Remedial Measures

The following recommendations should be implemented immediately or on a continuing basis:

1. The owner should determine the nature and extent of improvements required to provide adequate spillway capacity, and to repair and restore the dam.
2. In conjunction with this work, means should be provided to draw down the reservoir when required.
3. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert the downstream residents in the event of emergencies.
4. The owner should develop a formal operating and maintenance plan and inspect the dam regularly and perform necessary maintenance.

APPENDIX A  
CHECKLIST  
VISUAL INSPECTION  
PHASE I

APPENDIX A  
 CHECKLIST  
 VISUAL INSPECTION  
 PHASE I

NAME OF DAM	Perrins Marsh	COUNTY	Wyoming	STATE	Pennsylvania	DER:	066-009
TYPE OF DAM	Dry Masonry Wall			HAZARD CATEGORY	Significant	ID#	PA-0886
DATE(S) INSPECTION	November 10, 1980	WEATHER	Cloudy	TEMPERATURE	30 degrees		
POOL ELEVATION AT TIME OF INSPECTION	1173.6	M.S.L.	TAILWATER AT TIME OF INSPECTION	No	Tailwater	M.S.L.	
INSPECTION PERSONNEL:				REVIEW INSPECTION PERSONNEL: (February 5, 1981)			
Douglas Cosler				Lawrence D. Andersen			
Arthur Smith				James H. Poellot			
Bilgin Erel				Bilgin Erel			

Owner's Representative:  
 An employee of the owner

Bilgin Erel

RECODER

VISUAL INSPECTION  
PHASE 1  
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A (Dam is a stone wall.)	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	See Plate 3 for dam crest profile.	
RIPRAP FAILURES	There is no riprap.	

VISUAL INSPECTION  
PHASE I

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	An erosion ditch at left abutment dam junction. See Plate 2 for location.	Erosion ditch should be filled. Adequate erosion protection (such as riprap) should be provided at the junction of embankment with both abutments.
ANY NOTICEABLE SEEPAGE	None	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

VISUAL INSPECTION  
PHASE I  
OUTLET WORKS

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT		The dam has no outlet facilities.	The owner should take necessary measures to install outlet facilities, or prepare plans to drain the lake in the event of an emergency.
INTAKE STRUCTURE		N/A	
OUTLET STRUCTURE		N/A	
OUTLET CHANNEL		N/A	
EMERGENCY GATE		N/A	See remarks above.

VISUAL INSPECTION  
PHASE 1  
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS	
CONCRETE WEIR	Rectangular concrete overflow section in fair condition.		
APPROACH CHANNEL	Lake. Approach depth 0.5 to 1.0 foot.		
DISCHARGE CHANNEL	Earth channel. No problems observed.		
BRIDGE AND PIERS	None		

VISUAL INSPECTION  
PHASE I  
GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	The dam has no gated spillway.	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

VISUAL INSPECTION  
PHASE I  
INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

VISUAL INSPECTION  
PHASE I  
RESERVOIR

VISUAL EXAMINATION OF		OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES		No problems observed.	
SEDIMENTATION		Unknown	
UPSTREAM RESERVOIRS		None	

VISUAL INSPECTION  
PHASE I  
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF		OBSERVATIONS		REMARKS OR RECOMMENDATIONS	
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	SLOPES				
No problems observed.	No problems observed.				
		APPROXIMATE NUMBER OF HOMES AND POPULATION	Two houses within a 1,000-foot reach below the dam are likely to be affected in the event of a dam failure. Population (approximate) = 8.		

APPENDIX B  
CHECKLIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION  
AND HYDROLOGIC AND HYDRAULIC  
PHASE I

## APPENDIX B

## CHECKLIST

ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION  
PHASE I

NAME OF DAM Perrins Marsh

ID# NDI: PA-0886  
DER: 066-005

ITEM	REMARKS
AS-BUILT DRAWINGS	None available.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	Unknown (First Commonwealth of Pennsylvania inspection was performed in 1919.)
TYPICAL SECTIONS OF DAM	See Plate 2 (a sketch based on visual observations).
OUTLETS - PLAN	No existing outlet facilities.
- DETAILS	
- CONSTRAINTS	
- DISCHARGE RATINGS	

CHECKLIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION  
PHASE 1

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	None reported.
DESIGN REPORTS	None available.
GEOLGY REPORTS	No geology information reported.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available.

CHECKLIST  
ENGINEERING DATA  
DESIGN, CONSTRUCTION, OPERATION  
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None available.
BORROW SOURCES	Unknown
MONITORING SYSTEMS	No existing monitoring systems.
MODIFICATIONS	None reported.
HIGH POOL RECORDS	None available.

**CHECKLIST**  
**ENGINEERING DATA**  
**DESIGN, CONSTRUCTION, OPERATION**  
**PHASE I**

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None reported.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None available.
MAINTENANCE OPERATION RECORDS	None available.
SPILLWAY PLAN SECTIONS DETAILS	See Plate 2 (defined by field measurements).
OPERATING EQUIPMENT PLANS AND DETAILS	None available.

CHECKLIST  
ENGINEERING DATA  
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 1.8 square miles (wooded)  
ELEVATION, TOP OF NORMAL POOL AND STORAGE CAPACITY: 1174.0 (470 acre-feet)  
ELEVATION, TOP OF FLOOD CONTROL POOL AND STORAGE CAPACITY: 1174.6 (420 acre-feet)  
ELEVATION, MAXIMUM DESIGN POOL: Unknown  
ELEVATION, TOP OF DAM: 1174.6

SPILLWAY:

- a. Elevation 1174.0
- b. Type Rectangular concrete overflow section.
- c. Width 28 feet (perpendicular to flow)
- d. Length 6 feet
- e. Location Spillover Near center of embankment
- f. Number and Type of Gates None

OUTLET WORKS:

- a. Type Dam has no outlet facilities.
- b. Location N/A
- c. Entrance Inverts N/A
- d. Exit Inverts N/A
- e. Emergency Drawdown Facilities None

HYDROMETEOROLOGICAL GAGES:

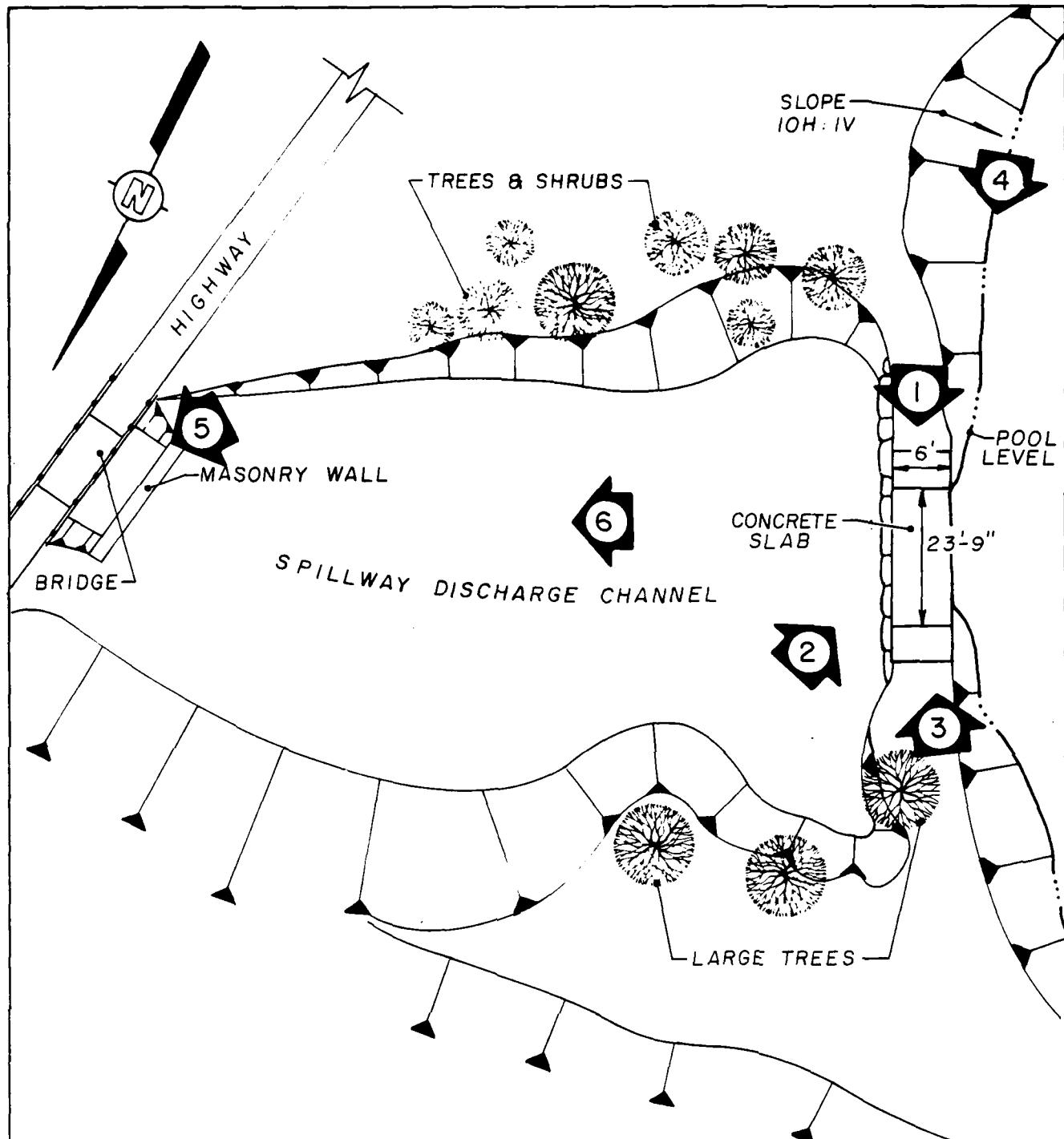
- a. Type None
- b. Location N/A
- c. Records None

MAXIMUM NONDAMAGING DISCHARGE: 34 cfs

**APPENDIX C**  
**PHOTOGRAPHS**

LIST OF PHOTOGRAPHS  
PERRINS MARSH DAM  
NDI I.D. NO. PA-0886  
NOVEMBER 10, 1980

<u>PHOTOGRAPH NO.</u>	<u>DESCRIPTION</u>
1	Dam crest (looking north).
2	Dam crest (looking west). Note collapsing wall.
3	Dam crest (looking south).
4	Right abutment shoreline.
5	Highway bridge (approximately 200 feet downstream from dam).
6	House (approximately 250 feet downstream from dam). (See Plate 1.)
7	Highway bridge (mile 0.3). (See Plate 1.)
8	Houses (mile 0.3). (See Plate 1.)



LEGEND:



INDICATES DIRECTION IN  
WHICH PHOTOGRAPH WAS  
TAKEN

PERRINS MARSH DAM  
KEY PLAN OF PHOTOGRAPHS  
FIELD INSPECTION DATE: NOV. 10, 1980

DEPARTMENT OF ENVIRONMENT

NOT TO SCALE



PHOTOGRAPH NO 1



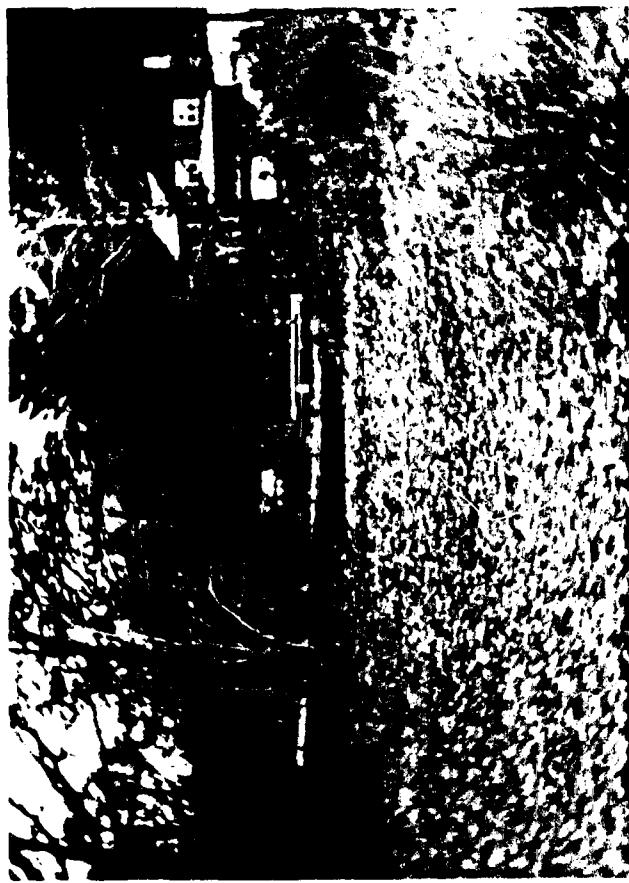
PHOTOGRAPH NO 2



PHOTOGRAPH NO 3



PHOTOGRAPH NO 4



PHOTOGRAPH NO. 6



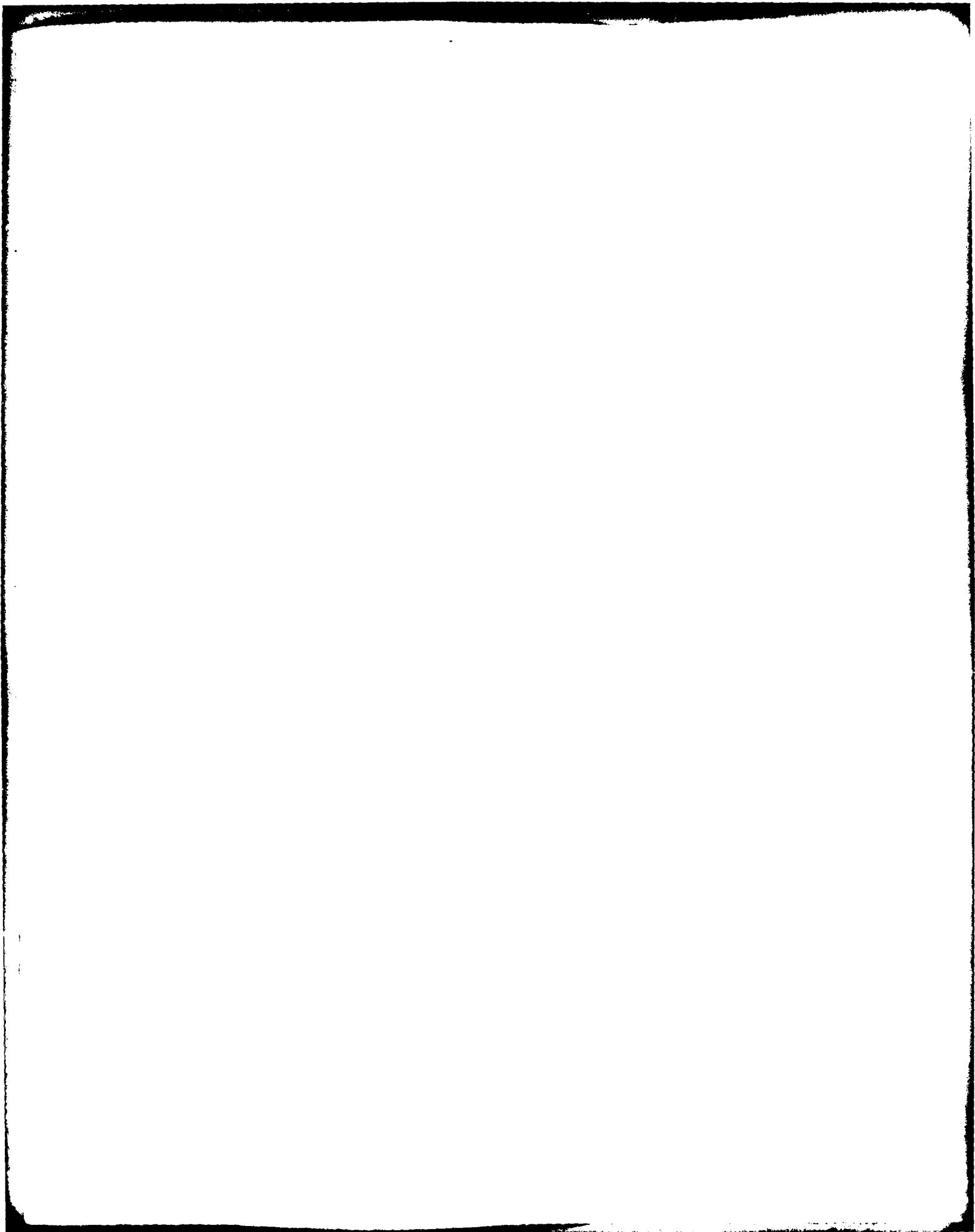
PHOTOGRAPH NO. 8



PHOTOGRAPH NO. 5



PHOTOGRAPH NO. 7



HYDROLOGY AND HYDRAULIC ANALYSIS  
DATA BASE

NAME OF DAM: Perrins Marsh Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = N/A INCHES/24 HOURS

STATION	1	2	3	4	5
Station Description	Perrins Marsh Pond	Perrins Marsh Dam			
Drainage Area (square miles)	1.8	--			
Cumulative Drainage Area (square miles)	1.8	1.8			
Adjustment of PMF for Drainage Area (%) <sup>(1)</sup>					
6 Hours	N/A	--			
12 Hours	N/A	--			
24 Hours	N/A	--			
48 Hours	N/A	--			
72 Hours	N/A	--			
Snyder Hydrograph Parameters					
Zone <sup>(2)</sup>	11	--			
C <sub>p</sub> /C <sub>t</sub> <sup>(3)</sup>	0.62/1.50	--			
L (miles) <sup>(4)</sup>	2.18	--			
L <sub>ca</sub> (miles) <sup>(4)</sup>	0.85	--			
t <sub>p</sub> = C <sub>t</sub> (L·L <sub>ca</sub> ) <sup>0.3</sup> (hours)	1.80	--			
Spillway Data					
Crest Length (ft)	--	28			
Freeboard (ft)	--	0.6			
Discharge Coefficient	--	2.65			
Exponent	--	1.5			

(1) Hydrometeorological Report 40, U.S. Weather Bureau, 1965.

(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C<sub>p</sub> and C<sub>t</sub>).

(3) Snyder's Coefficients.

(4) L = Length of longest water course from outlet to basin divide.

L<sub>ca</sub> = Length of water course from outlet to point opposite the centroid of drainage area.

STORAGE VS. ELEVATION

ELEVATION	ΔH, FEET	AREA (acres) <sup>(1)</sup>	ΔVOLUME (acre-feet) <sup>(2)</sup>	STORAGE (acre-feet)
1174 (Normal pool elevation)		83.6		0
	6		605.8	
1180		119.4		605.8
	20		2903.7	
1200		172.6		3509.5

(1) Planimetered from USGS maps.

(2) ΔVolume = ΔH/3 (A<sub>1</sub> + A<sub>2</sub> + √A<sub>1</sub>A<sub>2</sub>).

FL1000 HYDROGRAPHIC PACKAGE (HEC-1)  
DYNAMIC SATELLITE VERSION JULY 1978  
LAST MODIFICATION 01 APR 80

FLOOD HYDROGRAPH PACKAGE (HEC-1)  
Dam Safety Version JULY 1978  
LAST MODIFICATION 01 APR 80

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION			
				RATIO 1.50	RATIO 1.60	RATIO 1.70	RATIO 1.80
HYDROGRAPH AT	1 ( 4.66)	1.80	1 ( 42.84)	1513 46.35	1637 46.35	1761 49.87	1886 53.40
ROUTED TO	2 ( 4.66)	1.80	1 ( 27.36)	966 30.78	1087 30.78	1209 34.24	1333 37.88

100-year flood

## SUMMARY OF DAM SAFETY ANALYSIS

PLAN	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
Ratio OF RHE TO RHE	MAXIMUM RESERVOIR W. S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS
1.50	1176.13	1.53	191	966
1.60	1176.23	1.63	200	1087
1.70	1176.33	1.73	210	1209
1.80	1176.42	1.82	219	1338
100-year flood				

		DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
		0	34	34

# D'APPOLONIA

CONSULTING ENGINEERS, INC.

(1)

By BE Date 3-18-81 Subject PERRINS MARSH Sheet No. 1 of 2  
 Chkd. By MB Date 3/18/81 100-YR FLOOD PEAK. Proj. No. 80-556

### 100 - YEAR FLOOD PEAK CALCULATION:

REF: "Hydrologic Study Tropical Storm Agnes"  
 by Army Corps of Engineers 1975

$$\log(P) = \log(Q_m) + k(P, g) S.$$

where

$\log(P)$  = flood peak in cfs for given exceedence frequency  $P$ .

$\log(Q_m)$  = mean log of annual flood peaks

$$\log(Q_m) = C_m + 0.15 \log(A)$$

$C_m$  = a map coefficient. (Ref Fig 21)

$A$  = drainage area in sq. miles.

$k(P, g)$  = standard deviate for given  $P$  and skew coefficient  $g$ .

$S$  = standard deviation

$$S = C_s - 0.15 \log(A)$$

$C_s$  = a map coefficient (Ref Fig 22)

$g$  = skew coefficient (Ref Fig. 23)

**D'APPOLONIA**  
CONSULTING ENGINEERS, INC.

(2)

By BE Date 3-18-81 Subject PERRINS MARSH DAM Sheet No. 2 of 2  
Chkd. By \_\_\_\_\_ Date \_\_\_\_\_ 100-yr. FLOOD PEAK. Proj. No. 80-556

PERRINS MARSH 100-YR FLOOD P. 0.01

Drainage Area = 1.8 sq. miles.

$C_m = 2.1$  (Ref. Fig. 21)

$C_s = 0.36$  (" " 22)

$g = 0.40$  (" " 23)

$$\log (Q_m) = 2.1 + 0.75 \log (1.8) = 2.29$$

$$S = 0.36 - 0.05 \log (1.8) = 0.35$$

$$k(P, g) = k(0.01, 0.40) = 2.615^{(1)}$$

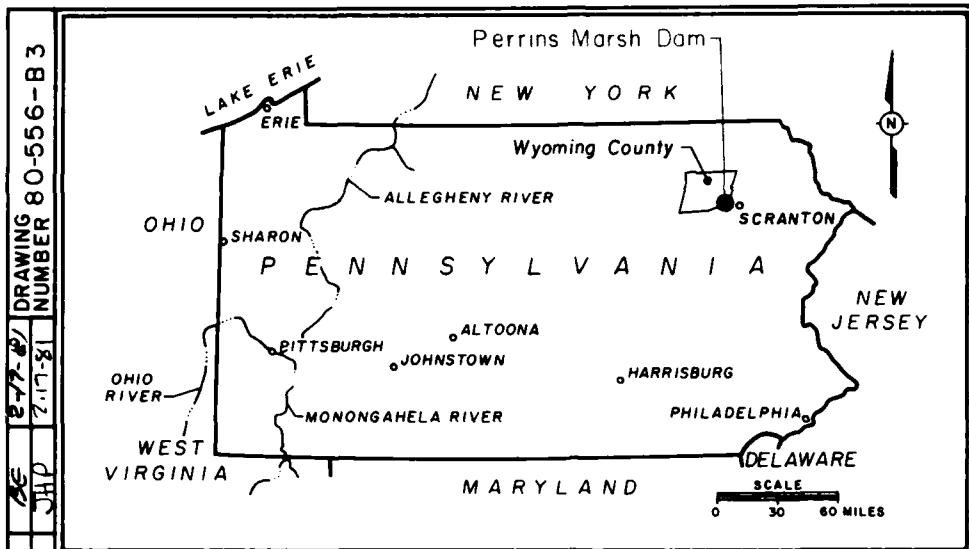
$$\begin{aligned} \log (Q_{0.01}) &= 2.29 + 2.615 \times 0.35 \\ &= 3.21 \end{aligned}$$

$$Q_{100-yr} = 10^{3.21} = 1620 \text{ cfs.}$$

(1) Ref. Hydrology for Engineers & Planners by A.T. Hjelmfelt & J.J. Cassidy Iowa State p. 30

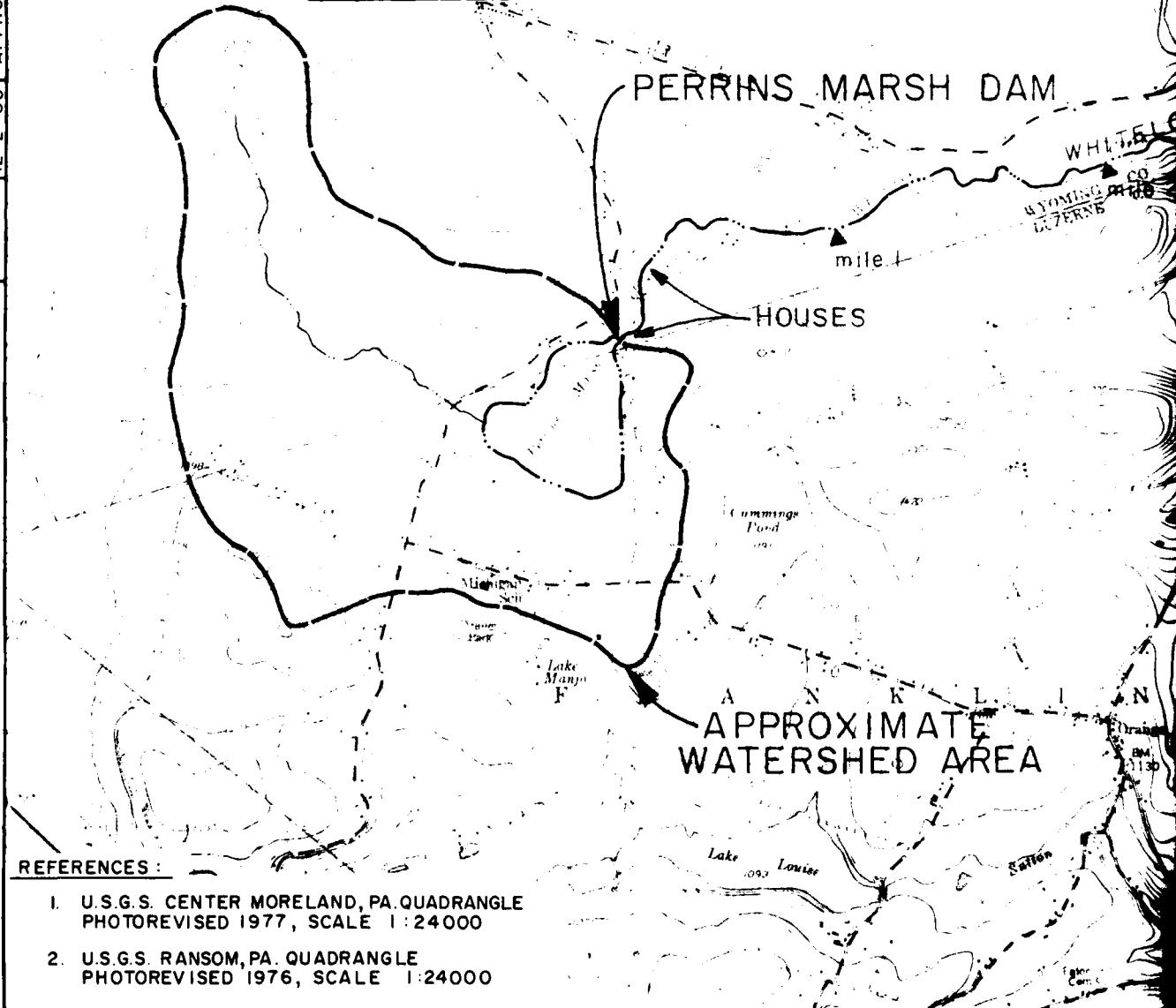
**APPENDIX E**

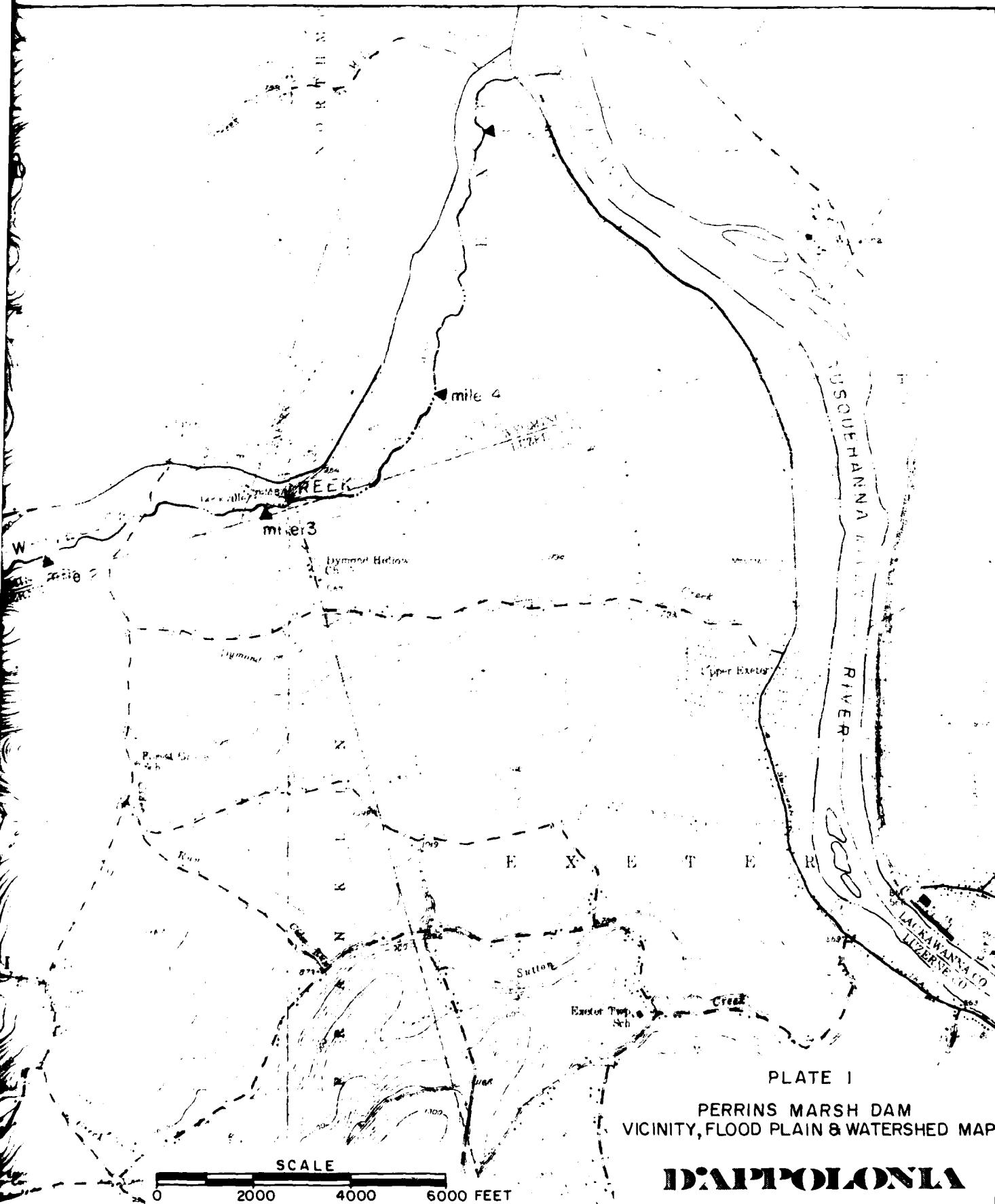
**PLATES**



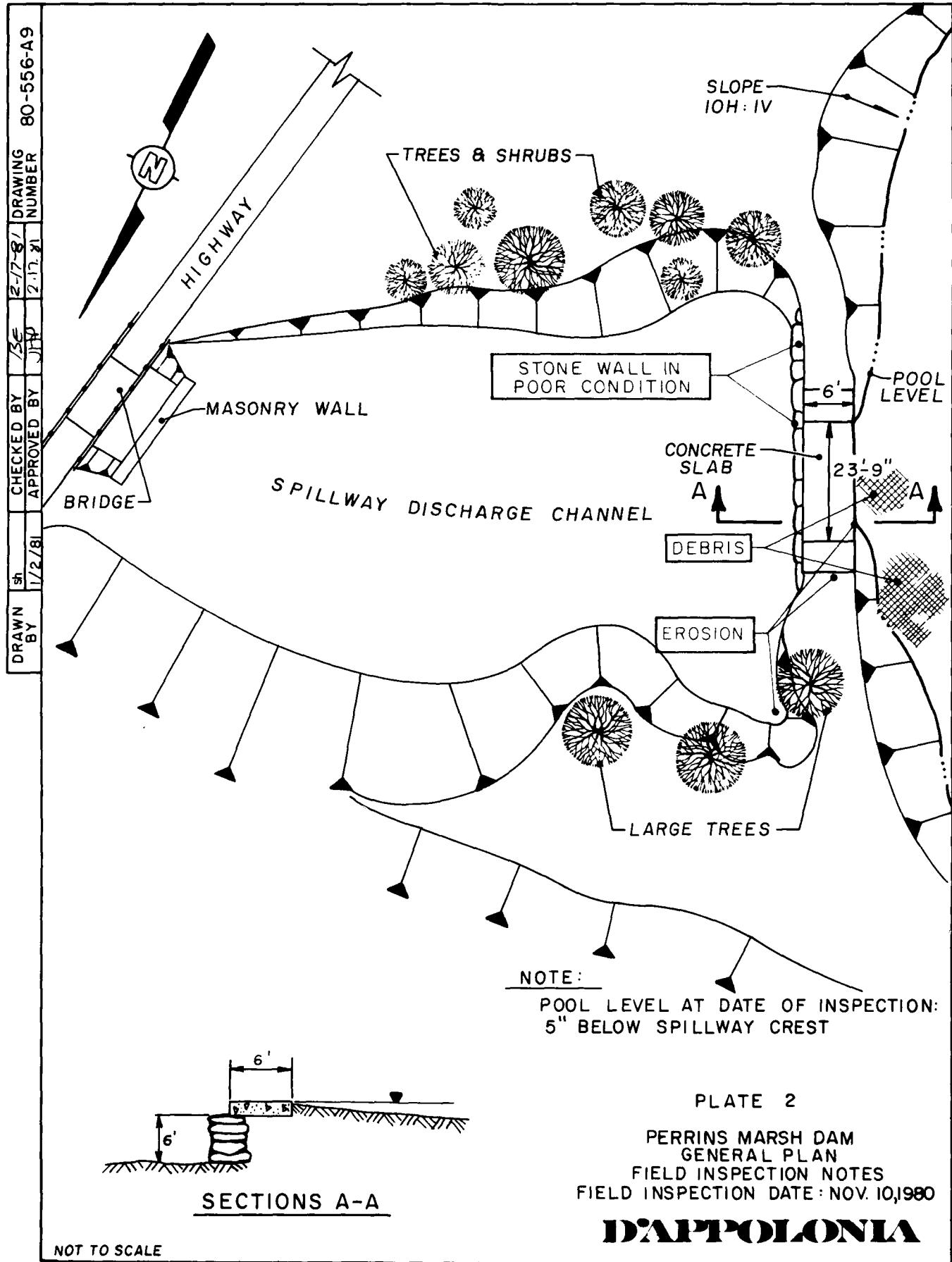
DRAWN BY ACS 12-2-80 CHECKED BY AE APPROVED BY JHP 2-7-81 DRAWING NO. 80-556-B 3

## KEY PLAN

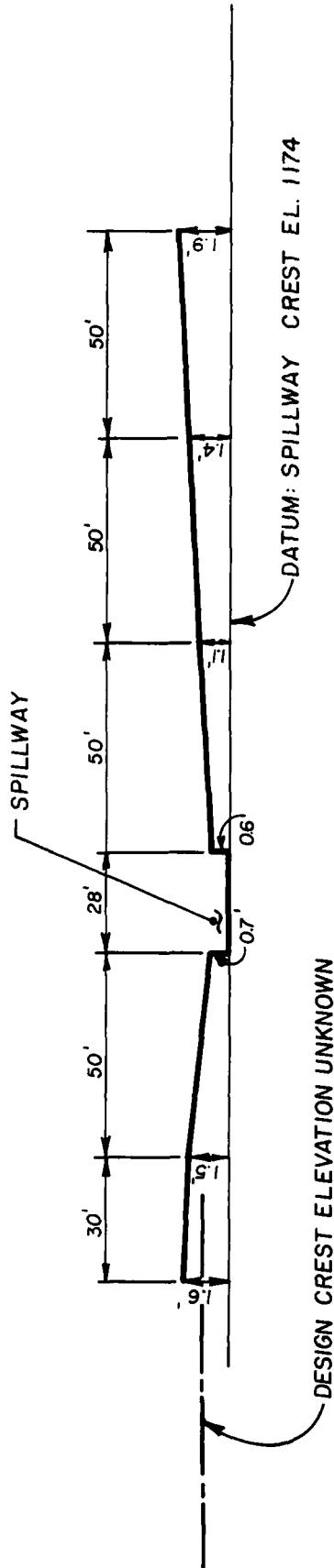




DIAPPOLONIA



DRAWN BY	Sh.	CHECKED BY	Z-17-S	DRAWING
			JHC	80-556-A10
12/26/80		APPROVED BY	Z-17 YI	NUMBER



DAM CREST PROFILE  
(LOOKING DOWNSTREAM)

NOTES:

1. DAM CREST WAS SURVEYED RELATIVE TO SPILLWAY CREST.
2. DATUM ELEVATION PER USGS MAPS.

PERRINS MARSH DAM  
DAM CREST SURVEY  
FIELD INSPECTION DATE NOV. 10, 1980

PLATE 3

**D'APPOLONIA**

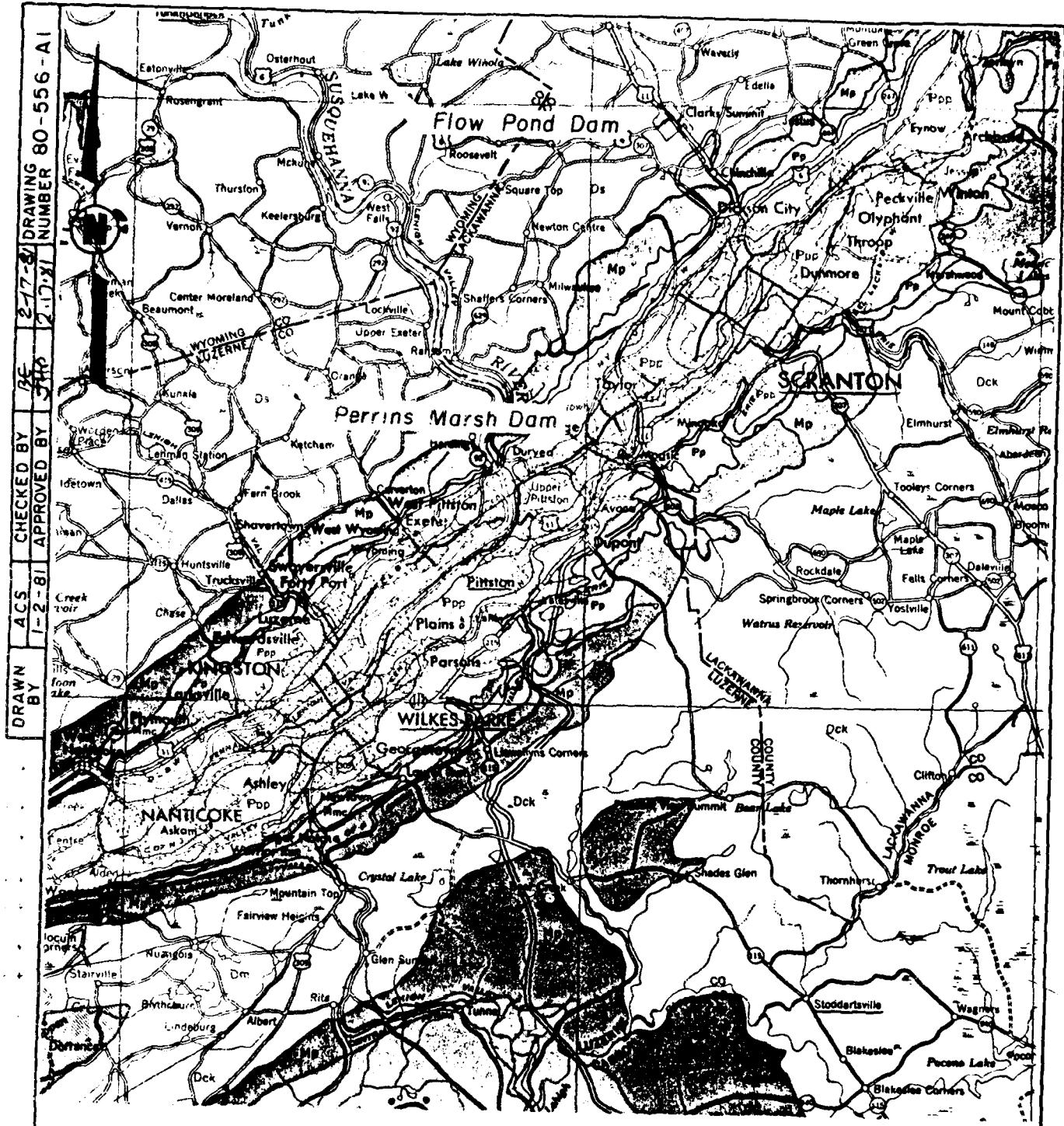
**APPENDIX F**  
**REGIONAL GEOLOGY**

REGIONAL GEOLOGY  
PERRINS MARSH DAM

The Perrins Marsh Dam (and Flow Pond Dam) is located in the glaciated low plateaus section of the Appalachian Plateau physiographic province, characterized as a mature glaciated plateau of moderate relief.

The geologic structure consists of a series of northeast trending folds which plunge gently to the southwest. The dip of the limbs of the folds in the vicinity of the Perrins Marsh Dam is five degrees or less, with the southeast limb steeper than the northwest limb. In general, the discontinuity trends are northeast and northwest.

The stratigraphy consists of glacial till which will range in thickness from very thin to approximately 300 feet. The glacial till is underlain by the Devonian Catskill Formation, which is approximately 1,700 feet thick in this area. The Catskill Formation is continental in origin, consisting of red shale, cross-bedded red and green sandstone and siltstone. The shale strata tend to weather rapidly when exposed.



SCALE

0 2 4 6 8 10 miles

REFERENCE

GEOLOGIC MAP OF PENNSYLVANIA PREPARED  
BY COMMONWEALTH OF PENNA. DEPARTMENT OF  
ENVIRONMENTAL RESOURCES, DATED 1980  
SCALE 1:250,000

GEOLOGY MAP

D'APPOLONIA

DRAWN BY ACS CHECKED BY 1-2-81 DRAWING 80-556-A4  
APPROVED BY 2-17-81 NUMBER 80-556-A4

## PENNSYLVANIAN APPALACHIAN PLATEAU

Pa

### Allegheny Group

*Colorful sequences of dolomite, shale, limestone and coal, numerous concho-coals, limestone thickens westward. Vanport Limestone in lower part of section includes Eriesport, Kittanning, and Clarion Formations.*

Pa

### Pottsville Group

*Predominantly sandstones and conglomerates with thin shales and coal, some coals mineable locally.*

Pa

### ANTHRACITE REGION

#### Post-Pottsville Formations

*Bracebridge group sandstones and shales with some conglomerates and numerous mineable coals.*

Pa

### Pottsville Group

*Light gray to white, coarse grained sandstones and conglomerates with some mineable coal. Includes Sharp Mountain, Schuylkill, and Tumbling Run Formations.*

## MISSISSIPPIAN

Nmc

### Mauch Chunk Formation

*Red shales with brown to greenish gray Haile sandstone. Includes Greenbrier Limestone in Fayette, Westmoreland, and Somerset counties. Logontown Limestone at the base in southwestern Pennsylvania.*

Pa

### Pocono Group

*Predominantly gray, hard, massive, cross bedded sandstone and sandstone with some shale, includes in the Appalachian Plateau, Harpoon, Shannop, Canobie, Cissoquo, Ticon, and Kopp Formations. Includes part of the base of M.L. Fuller in Potter and Tioga counties.*

## DEVONIAN UPPER

### CENTRAL AND EASTERN PENNSYLVANIA

Pa

### Oswayo Formation

*Brownish and greenish gray, fine and medium grained sandstone with some shales and scattered calcareous lenses. Includes red shales which become more numerous eastward. Relation to type Oswayo not proved.*

Dick

### Catskill Formation

*Chiefly red to brownish shales and sandstones, includes gray and greenish sandstone tongues named Elk Mountain, Honesdale, Shohola, and Delaware River in the east.*

Dm

### Marine beds

*Gray to olive brown shales, grainwackes and sandstones containing Chemung beds and Portage beds including Burkett, Bradell, Harrell, and Trimmers Rock. Tully Limestone at base.*

Ds

### Susquehanna Group

*Barbed line is "Chemung-Catskill" contact of Second Pennsylvania Survey. County reports barbs on "Chemung" side of line.*

## GEOLOGY MAP LEGEND

### REFERENCE.

GEOLOGIC MAP OF PENNSYLVANIA PREPARED  
BY COMMONWEALTH OF PENNA., DEPARTMENT OF  
ENVIRONMENTAL RESOURCES, DATED 1960  
SCALE 1:250,000

